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Herpetofauna of protected areas in the Caatinga V: Seridó Ecological Station (Rio Grande do Norte, Brazil)

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Abstract: We provide a list of lizards, snakes, chelonians, and amphibians collected during a 30-day expedition to the Seridó Ecological Station (ESEC Seridó), Rio Grande do Norte state, Brazil. We sampled species using thirty-seven pitfall trap stations composed of four buckets each, along with glue traps and active searches. We recorded 13 species of lizards, eight snakes, 19 amphibians, and one chelonian. Rarefaction curves suggest local biodiversity is still underestimated. Sampling during rainy season was crucial to stabilize rarefaction curve for amphibians. Comparisons of our results with data from literature show we did not capture some arboreal and semifossorial lizards known for the area. Seridó Ecological Station fauna is characterized mainly by generalist species common to lowland Caatinga sites. Still, several Caatinga endemics species are found, which underscore the importance of this small but representative protected area.

Key words: Anurofauna; squamate reptiles; chelonians; distribution; endemism; conservation of semiarid

INTRODUCTION

The Caatinga is an exclusively Brazilian biome (Tabarelli and Silva 2005) located at northeastern portion of the country and occupying about 800,000 km². It is limited to east and northwest by Atlantic and Amazon forests, respectively, and to southwest and south by the Cerrado savannas (Andrade et al. 2005; Leal et al. 2005a; Prado 2005). Caatinga is located in a semiarid region characterized by low and irregular rainfall, high temperatures and high light intensity that causes high evaporation rates and soil desiccation, culminating in a water deficit throughout most of the year (Prado 2005; Trovão et al. 2007). The vegetation is deciduous, represented by semiarid xerophytic formations consisting in many cases of trees, low shrubs, cacti and bromeliads (Trovão et al. 2004; Prado 2005; Queiroz et al. 2006). However, other vegetation types are also present and high floristic richness can be found, with some areas having medium-sized to large trees with high canopies, a feature that characterizes Caatinga also as seasonally dry tropical forest (STDF; sensu Pennington et al. 2009; Werneck 2011).

For a long time Caatinga has been considered poorly studied and under poorly protected (less than 2% of its area) (Leal et al. 2005a). This scarce knowledge and low levels of protection come from the long-held historical view that arid regions have low productivity and diversity (Albuquerque and Andrade 2002). This view has been reversed in recent years with the increase in inventories and long-term research (Albuquerque et al. 2012; Barbosa et al. 2013) and in the number of protected areas, now about 7.5% of Caatinga territory (MMA 2016). However, the biome continued to suffer same old problems, such as intense deforestation and expansion of irrigated crops, factors which have gradually promoted soil salinization, increasing water evaporation (Drumond et al. 2000). Replacement of natural areas with agriculture and wild fires have acted together with livestock to speed up desertification (Casteleti et al. 2003). Goats have been released into natural areas and consume large amounts of plants, which may cause long-term changes in the landscape (Leal et al. 2005b).

The suggestion that the Caatinga herpetofauna had low endemism and hence did not harbour its own fauna was common sense up to the early 1980s (Vanzolini et al. 1980). This scenario has changed with newly described

species and moderate to high levels of endemism being reported for some groups (Rodrigues 1991a, 1991b, 2000; Heyer and Juncá 2003; Magalhães et al. 2014). In fact, diversity of reptiles and amphibians in Caatinga is remarkable given its severe environmental conditions (Navas et al. 2002; Rodrigues 2005). Knowledge for the area is still growing as new areas are being inventoried (Ribeiro et al. 2012; Garda et al. 2013; Cavalcanti et al. 2014; Pedrosa et al. 2014; Magalhães et al. 2015; Pereira et al. 2015). However, it is still undersampled, with just a few areas currently sampled in entire states in the Northeastern region. Information on diversity and endemism can only be obtained with implementation and publication of field surveys, which are the key for development of more efficient conservation strategies (Silveira et al. 2010).

We present a list of amphibians and reptiles collected during a 30-day field expedition to Seridó Ecological Station (ESEC Seridó) located in Serra Negra municipality, Rio Grande do Norte state, Brazil. Our methodology is similar to other four inventories recently published for the biome (Garda et al. 2013; Cavalcanti et al. 2014; Pedrosa et al. 2014; Magalhães et al. 2015). Rio Grande do Norte state has a total area of 52,797 km^2 (roughly the size of West Virginia,United States, or the Netherlands). Still, only a single amphibian inventory and some lists for squamates have been published for the state (Freire 1996; Delfim and Freire 2007; Freire et al. 2009; Magalhães et al. 2013). Over 90% of the area of Rio Grande do Norte state is covered by the Caatinga biome.

MATERIALS AND METHODS

Study site

Seridó Ecological Station (ESEC Seridó; Figure 1) is located in Serra Negra do Norte municipality in the southwestern region of Rio Grande do Norte state (06°35′ to 06°40′ S, 037°20′ to 037°39′ W) and encompasses an area of ca. 1,166 ha (ICMBIO 2016). Its location is at "Depressão Sertaneja Setentrional", one of the eight ecoregions recognized for Caatinga biome (Velloso et al. 2002), whose average annual rainfall is around 500–800 mm. Open Caatinga vegetation characterizes it, with shallow soils distributed in a wide plain interspersed by residual higher elevation areas over landscape (Velloso et al. 2002).

Vegetation is composed mostly by herbs and shrubs, with predominant genera as *Amburana* Schwacke & Taub. (Fabaceae), *Ximenia* Plum. ex L. (Olacaceae), *Luetzelburgia* Harms (Fabaceae), *Mimosa* L. (Fabaceae) among others, and a endemic species, *Gossypium mustelinum* Miers ex G.Watt (Malvaceae) (Velloso et al. 2002). The region known as "Seridó" located in Rio Grande do Norte suffer remarkable human disturbances, which combined with the delicate nature of local environment

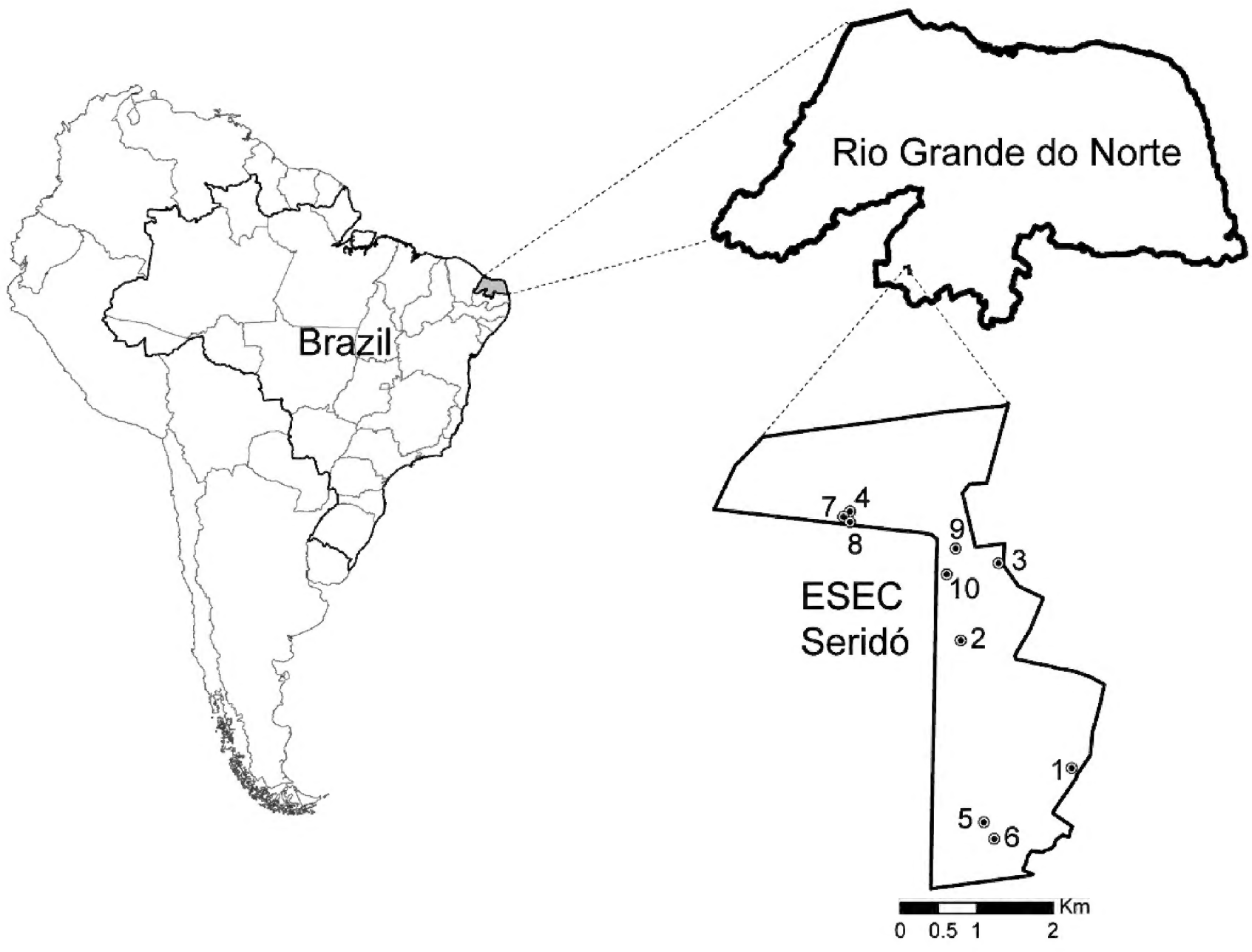


Figure 1. Map of South America showing Brazil (thick line) and Rio Grande do Norte State (grey inset). Right side shows Seridó Ecological Station (ESEC Seridó), its map and the ten sampled points. Points 1–5 refer to pitfall trap arrays. Point 10 refers to dam and remaining areas surveyed through active searches.

characterize this area as one of the desertification centers in Brazil (Sampaio 2003; Zanella 2010).

Data collection

We sampled amphibians and reptiles from 3 May to 3 June 2013. Data collection was performed at end of rainy season, which usually extends from January to May (Santana and Souto 2006). The period in which we conducted the expedition had an average rainfall of 96.2 mm according to data from closest Meteorological station (Instituto Nacional de Metereologia; Caicó municipality, Rio Grande do Norte state).

We used three sampling methods: 1. *Active searches* (according Crump and Scott 1994), held by at least four collectors for 8 hours a day, in which environment was systematically surveyed in different parts of the ESEC Seridó (Figures 2–7); 2. *Pitfall trapping* (according Cechin and Martins 2000; Enge 2001) (Figures 4 and 5), using 37 pitfall stations (each composed of four buckets each, arranged in a Y shape and connected by 6 m plastic

Figures 2–7. Habitats sampled during herpetological survey at Seridó Ecological Station (ESEC Seridó), Rio Grande do Norte State, Brazil. **2.** Denser vegetation (background) with rocky outcrops, herbaceous plants and shrubs and leaf litter; **3.** open vegetation with herbaceous plants and shrubs without leaf litter; **4.** temporary stream bank with arboreal formation and presence of litter; **5.** "massapê" soil (presence of *pitfall trapping*); **6 and 7.** Denser vegetation, presence of herbaceous and shrubby with leaf litter, without rock formations (presence of *glue traps*).

drift fences) distributed in five different habitats. In each habitat, stations were at least 20m apart; 3. *Glue traps,* four squares of 20 cm^2, two on ground and two on branches or tree trunks, distributed in each pitfall trap station (Figures 6 and 7).

The four pitfall trap arrays were set in different habitats of ESEC (Figures 2–7): 2. Denser vegetation with herbaceous plants and shrubs with leaf litter and rock outcrops; 3. Open vegetation with herbaceous plants and shrubs without leaf litter; 4. A temporary stream bank with arboreal formation and soil covered by leaf litter; 5. "Massapê" soil, consisting of a compact clay soil with low permeability (as described in Andrade 2005; Oliveira Andrade 2007); 6–7. Denser vegetation with herbaceous plants and shrubs with leaf litter but lacking rock outcrops.

In total, sampling was conducted over 30 days with 26,640 hours of open traps checked daily along with 960 hours of active searches. Specimens were killed by injection of lidocaine, preserved in 10% formalin and then stored in 70% ethanol solution. Specimens were collected in accordance with appropriate collecting permits (SISBIO #33402-1, SISBIO #36095-8 and SISBIO #29550-4). Species identification was based on Bokermann (1966), Peters and Orejas-Miranda (1970), Vanzolini et al. (1980), Rodrigues (1986, 1987), Avila-Pires (1995), Oliveira and Lírio Junior (2000), Colli et al. (2003), Vanzolini (2004), Magalhães et al. (2014) and Recoder et al. (2014). Furthermore, we compared specimens with animals housed in Coleção Herpetológica of Universidade Federal da Paraíba (CHUFPB) where all specimens collected were also deposited. Moreover, identifications of several frogs were confirmed by comparing recorded advertisement calls with sound files deposited in the sound collection of UFRN (Arquivos Sonoros da UFRN-ASUFRN) and literature descriptions.

Data analysis

To evaluate the quality of sampling effort we constructed rarefaction curves for lizards, amphibians and all herpetofauna combined, based on individuals (Gotelli and Colwell 2001), using Chao2P species estimator (Lopez et al. 2012), in EstimateS 8.2.0 (Collwell 2005) and R (R Development Core Team 2009). The curves were obtained through 1,000 resampling of original data, with no reposition.

RESULTS

We collected 13 species of lizards, eight snakes, 19 amphibians, and one chelonian (Table 1; Figures 8–45). Only the rarefaction curve for amphibians reached asymptote (Figure 46). Despite use of Chao 2P estimator and large sample size, rarefaction curves for lizards and herpetofauna are still rising. Terrestrial frogs (e.g., *Leptodactylus macrosternum* Miranda-Ribeiro, 1926, *Leptodactylus troglodytes* Lutz, 1926, *Dermatonotus muelleri* [Boettger, 1885], *Rhinella granulosa* [Spix, 1824]) were usually caught in pitfall traps, while treefrogs (*Corythomantis greeningi* Boulenger, 1986, *Dendropsophus nanus* [Boulenger, 1989], *Hypsiboas raniceps* Cope, 1862, *Phyllomedusa nordestina* Caramaschi, 2006, *Scinax x-signatus* [Spix, 1824]) were found during active searches (Figure 47). Same pattern was seen for lizards: strictly terrestrial species (*Cnemidophorus ocellifer* [Spix, 1825], *Gymnodactylus geckoides* Spix, 1825, *Vanzosaura multiscutata* [Amaral, 1933]) were more frequently captured in pitfall traps while arboreal ones (e.g., *Hemidactylus agrius* Vanzolini, 1978) or those using perches (*Tropidurus hispidus* [Spix, 1825], *Tropidurus semitaeniatus* [Spix, 1825]) were found more often in active searches or were better distributed among all methods. The use of various methods is important in sampling snakes with exception of glue traps, which were ineffective to capture them (Figure 47).

DISCUSSION

All lizards and seven snakes had already been collected in a previous study that recorded 16 lizards, 14 snakes, and two amphisbaenids from Seridó Ecological Station (Freire et al. 2009). In addition, the snake *Epictia borapeliotes* (Vanzolini, 1996), also collected in this inventory, was recorded in a later study (Guedes et al. 2014). Although those previous studies presented all our recorded species of lizards, snakes and amphisbaenids, those authors did not use richness estimators coupled with rarefaction curves to confirm inventory efficiency. We also collected one chelonian and 19 frogs not previously recorded from the study area.

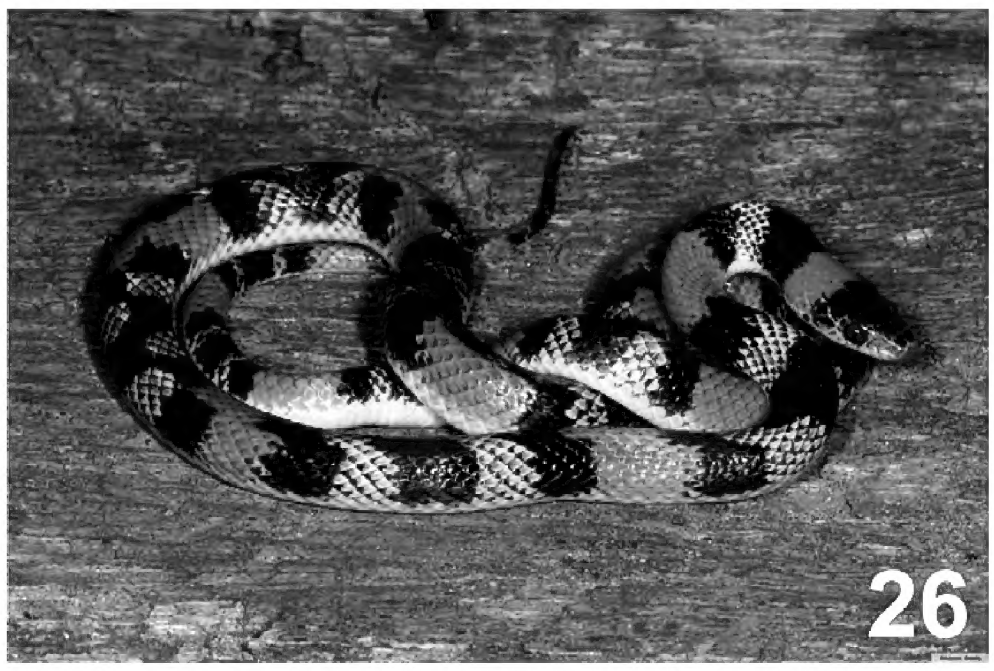
Lizard species richness at ESEC Seridó (16 species) is regionally significant when compared to other Caatinga areas: Exu/Pernambuco (14 species; Vitt 1995), Floresta Nacional de Negreiros (14 species; Pereira et al. 2015), PARNA Serra da Capivara (17 species; Cavalcanti et al. 2014), PARNA do Catimbau (15 species; Pedrosa et al. 2014) and PARNA da Chapada Diamantina (25 species; Magalhães et al. 2015). The lizard families Gekkonidae, Phyllodactylidae, Teiidae and Tropiduridae have similar species compositions in other Caatinga areas (Vitt 1995; Garda et al. 2013; Pedrosa et al. 2014), which is expected because many of their representatives are common in open areas and can use a variety of microhabitats found in various xerophytic formations (Vitt 1995). In contrast, Gymnophthalmidae, which is frequently found on leaf litter, has a low richness even at Exu/Pernambuco, where only *V. multiscutata* is found (Vitt 1995). A greater richness of gymnophthalmids can be observed for "sand dunes in the middle São Francisco River" and this particularity is related to speciation factors exclusive of this region (Rodrigues 1996; Rodrigues 2005).

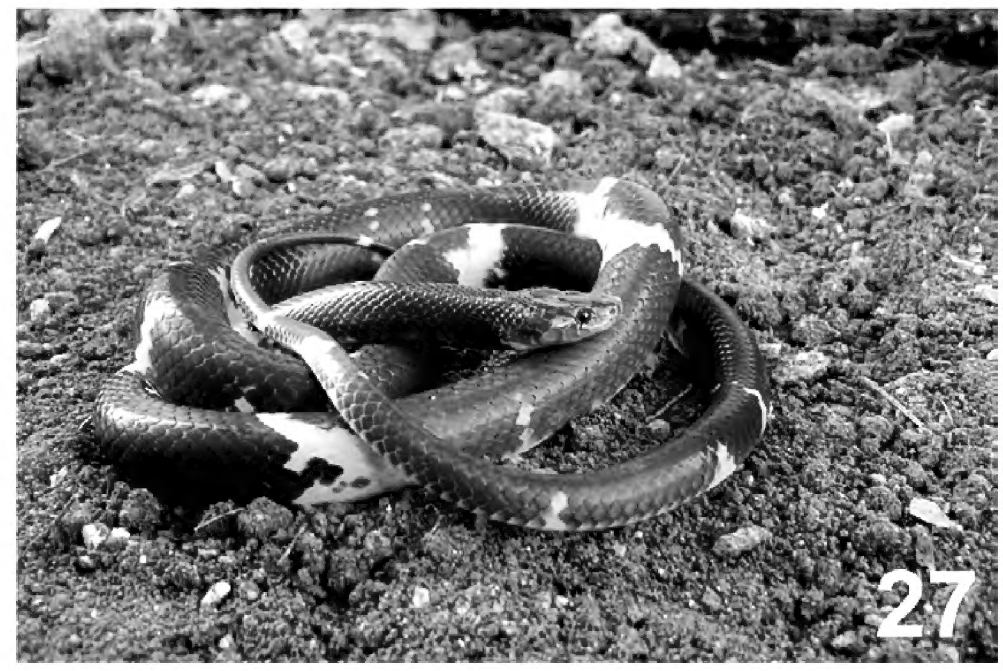
Table 1. List of squamates, chelonians and anuran amphibians known for Seridó Ecological Station (ESEC Seridó), Rio Grande do Norte, Brazil. Abbreviations of habitat and distribution categories were adapted from Rodrigues (2005) and Freitas and Silva (2007) and are as follows: **Habitat** = A – arboreal, AQ – aquatic, L – leaf litter, F – fossorial, S – saxicolous, T – terrestrial. **Distribution** = WO – wide occurrence in the biome, R – relictual distribution, DS – dependent drainage system, ? – unknown or preliminary data.

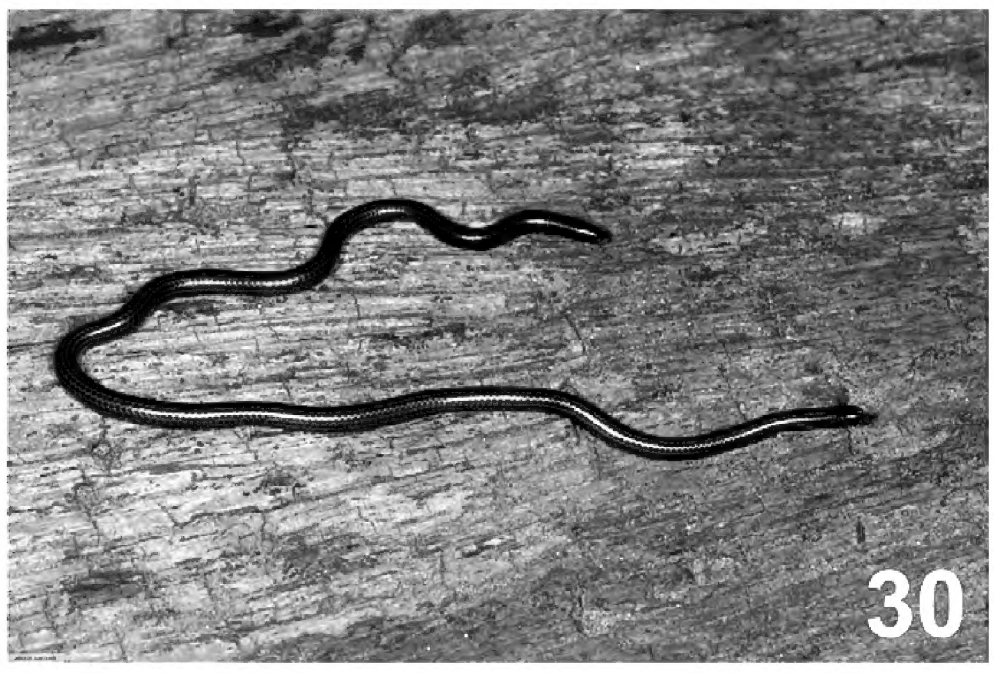
Family	Species	Source	Habitat	Distribution	Number of specimens
Lizards and amphisbaenids					
Amphisbaenidae	*Amphisbaena alba* Linnaeus, 1758	Freire et al. (2009)	F	WO	-
	Amphisbaena vermicularis Wagler, 1824	Freire et al. (2009)	F	WO	-
Gekkonidae	*Hemidactylus agrius* Vanzolini, 1978	present study, Freire et al. (2009)	A	R	37
	Hemidactylus brasilianus (Amaral, 1935)	Freire et al. (2009)	A	WO	-
	Lygodactylus klugei (Smith, Martin & Swain, 1977)	present study, (Freire et al. 2009)	A	WO	40
Gymnophthalmidae	*Micrablepharus maximiliani* (Reinhardt & Lütken, 1862)	Freire et al. (2009)	L	WO	-
	Vanzosaura multiscutata (Amaral, 1933)	present study, (Freire et al. 2009)	L	WO	39
Iguanidae	*Iguana iguana* (Linnaeus, 1758)	present study, (Freire et al. 2009)	A	WO	4
Phyllodactylidae	*Gymnodactylus geckoides* Spix, 1825	present study, (Freire et al. 2009)	T	WO	63
	Phyllopezus periosus Rodrigues, 1986	present study, (Freire et al. 2009)	S	R	10
	Phyllopezus pollicaris (Spix, 1825)	present study, (Freire et al. 2009)	S	WO	36
Polychrotidae	*Polychrus acutirostris* Spix, 1825	Freire et al. (2009)	A	WO	-
Scincidae	*Mabuya heathi* (Schmidt & Inger, 1951)	present study, (Freire et al. 2009)	B	WO	3
Teiidae	*Ameiva ameiva* (Linnaeus, 1758)	present study, (Freire et al. 2009)	T	WO	1
	Cnemidophorus ocellifer (Spix, 1825)	present study, (Freire et al. 2009)	T	WO	46
	Tupinambis merianae (Duméril & Bibron, 1839)	present study, (Freire et al. 2009)	T	WO	1
Tropiduridae	*Tropidurus hispidus* (Spix, 1825)	present study, (Freire et al. 2009)	T/S	WO	29
	Tropidurus semitaeniatus (Spix, 1825)	present study, (Freire et al. 2009)	S	WO	35
Snakes					
Boidae	*Boa constrictor* Linnaeus, 1758	(Freire et al. 2009)	T/A	WO	-
	Epicrates assisi Machado, 1945	(Freire et al. 2009)	T/A	WO	-
Dipsadidae	*Boiruna sertaneja* Zaher, 1996	(Freire et al. 2009)	T	WO	-
	Erytrolamprus viridis (Günther, 1862)	(Freire et al. 2009)	T	WO	-
	Leptodeira annulata (Linnaeus, 1758)	present study, (Freire et al. 2009)	T	WO	1
	Lygophis dilepis Cope, 1862	present study, (Freire et al. 2009)	T	WO	1
	Oxybelis aeneus (Wagler, 1824)	(Freire et al. 2009)	A	WO	-
	Oxyrhopus trigeminus Duméril, Bibron & Duméril, 1854	present study, (Freire et al. 2009)	T/A	WO	2
	Philodryas nattereri Steindachner, 1870	present study, (Freire et al. 2009)	T	WO	2
	Pseudoboa nigra (Duméril, Bibron & Duméril, 1854)	present study, (Freire et al. 2009)	T	WO	1
	Thamnodynastes sp2	present study, (Freire et al. 2009)	T	WO	1
Elapidae	*Micrurus ibiboboca* (Merrem, 1820)	(Freire et al. 2009)	T	WO	-
Leptotyphlopidae	*Epictia borapeliotes* (Vanzolini, 1996)	present study, (Guedes et al. 2014)	T	WO	6
Viperidae	*Bothrops erythromelas* Amaral, 1923	present study, (Freire et al. 2009)	T	WO	2
	Crotalus durissus Linnaeus, 1758	(Freire et al. 2009)	T	WO	-
Chelonians					
Chelidae	*Mesoclemmys tuberculata* (Luederwaldt, 1926)	present study	AQ	DS	2
Anurans					
Bufonidae	*Rhinella granulosa* (Spix, 1824)	present study	T	WO	59
	Rhinella jimi (Stevaux, 2002)	present study	T	WO	38
Hylidae	*Corythomantis greeningi* Boulenger, 1986	present study	A	WO	12
	Dendropsophus nanus (Boulenger, 1989)	present study	A	WO	17
	Hypsiboas raniceps Cope, 1862	present study	A	WO	10
	Phyllomedusa nordestina Caramaschi, 2006	present study	A	WO	21
	Scinax x-signatus (Spix, 1824)	present study	A	WO	11
Odontophynidae	*Proceratophrys cristiceps* (Müller, 1883)	present study	T	WO	38
Leptodactylidae	*Leptodactylus fuscus* (Schneider, 1799)	present study	T	WO	40
	Leptodactylus macrosternum Miranda-Ribeiro, 1926	present study	T	WO	98
	Leptodactylus vastus Lutz, 1930	present study	T	WO	9
	Leptodactylus troglodytes Lutz, 1926	present study	T	WO	73
	Physalaemus albifrons (Spix, 1824)	present study	T	WO	2
	Physalaemus cicada Bokermann, 1966	present study	T	WO	36
	Physalaemus cuvieri Fitzinger, 1826	present study	T	WO	1
	Physalaemus sp.	present study	T	?	25
	Pleurodema diplolister (Peters, 1870)	present study	T	WO	52
	Pseudopaludicola pocoto Magalhães, Loebmann, Kokubum, Haddad & Garda, 2014	present study	T	?	43
Microhylidae	*Dermatonotus muelleri* (Boettger, 1885)	present study	T	WO	47

Figures 8–15. Anurans collected at Seridó Ecological Station (ESEC Seridó): **8.** *Rhinella jimi*, **9.** *Rhinella granulosa*, **10.** *Corythomantis greeningi*, **11.** *Dendropsophus nanus*, **12.** *Hypsiboas raniceps*, **13.** *Phyllomedusa nordestina*, **14.** *Scinax x-signatus*, **15.** *Leptodactylus fuscus*.

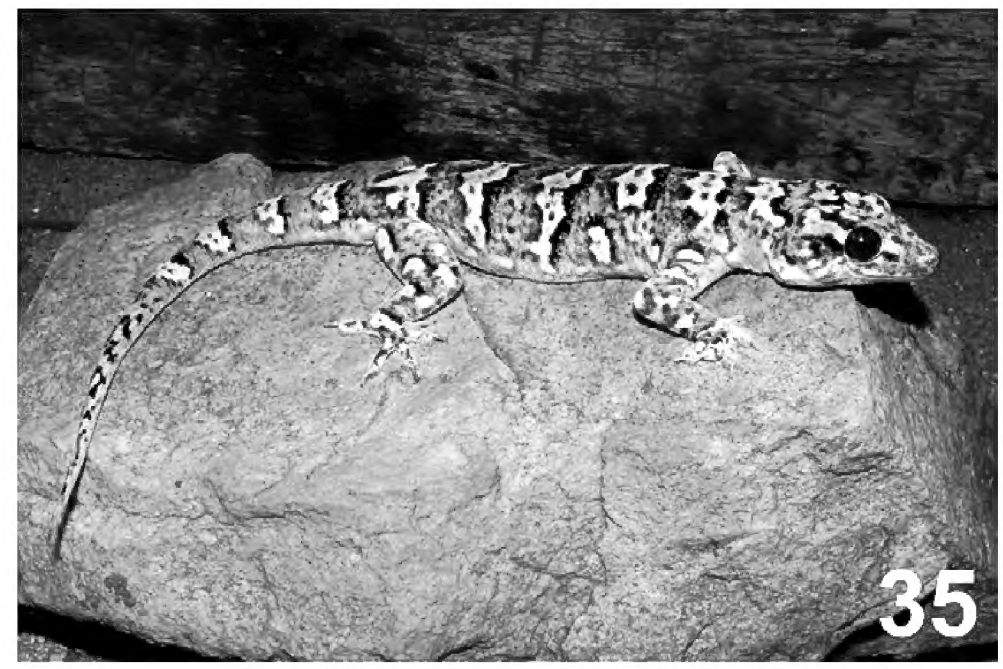
Figures 16–23. Anurans collected at Seridó Ecological Station (ESEC Seridó): **16.** *Leptodactylus macrosternum*, **17.** *Leptodactylus vastus*, **18.** *Physalaemus cicada*, **19.** *Physalaemus albifrons*, **20.** *Pleurodema diplolister*, **21.** *Pseudopaludicola pocoto*, **22.** *Dermatonotus muelleri*, **23.** *Proceratophrys cristiceps*.

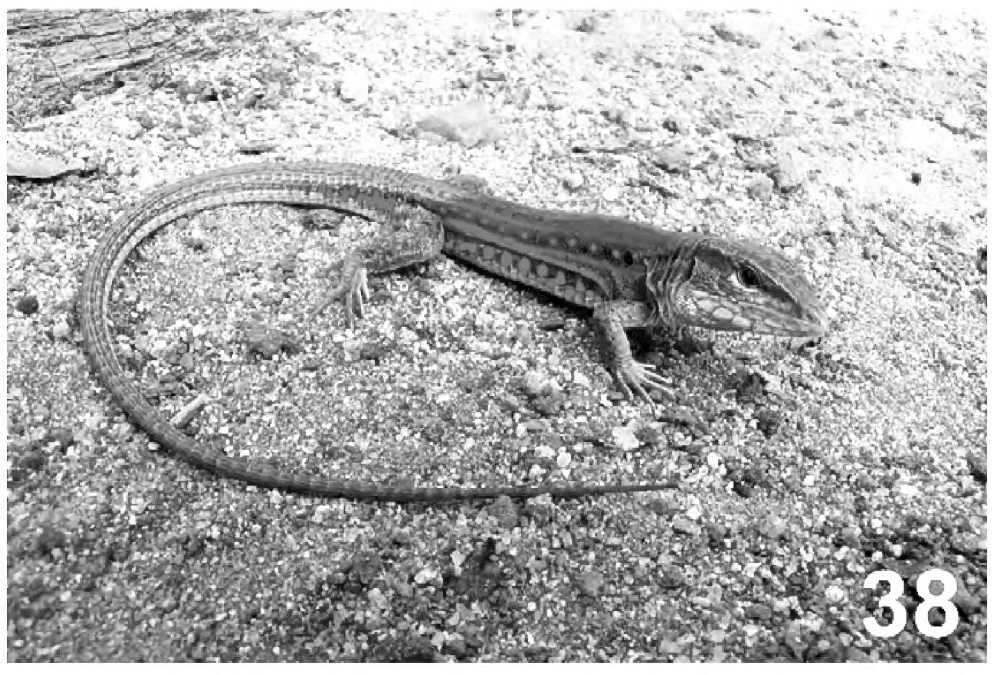




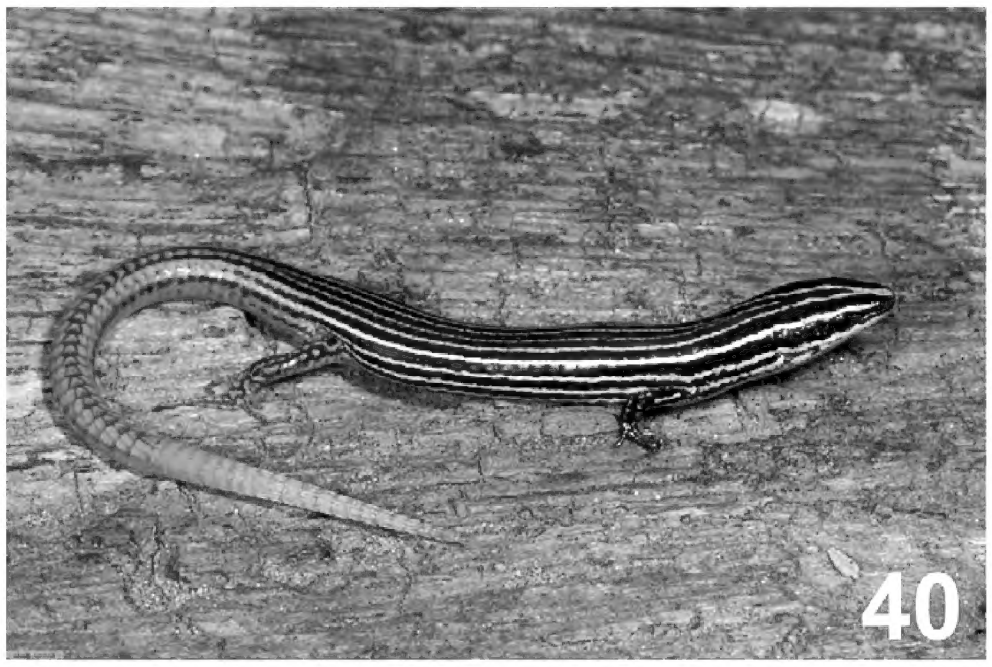


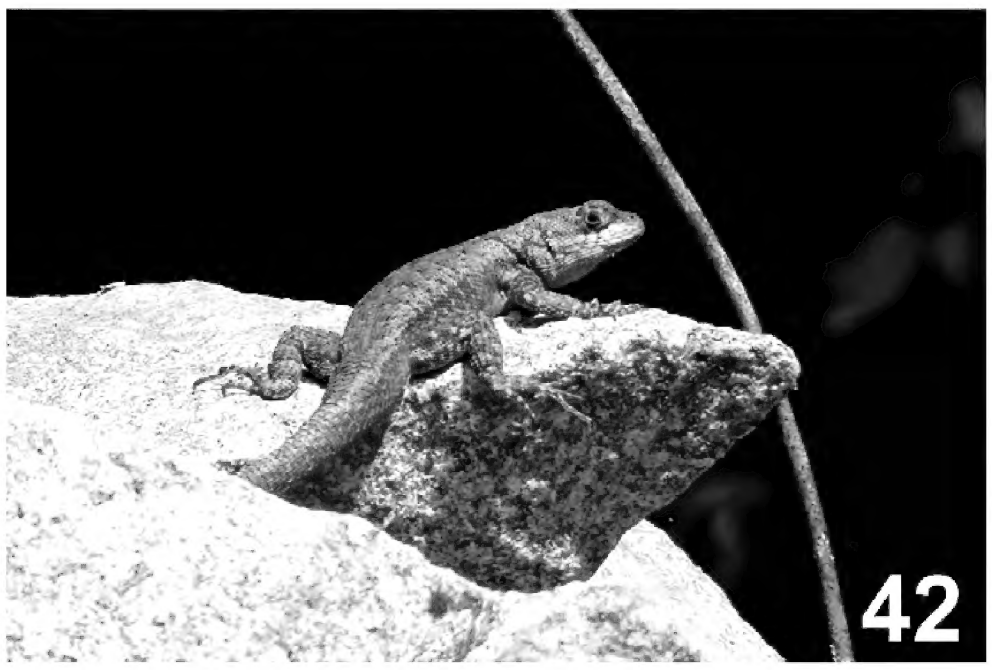
Figures 24–31. Snakes collected at Seridó Ecological Station (ESEC Seridó): **24.** *Leptodeira annulata*, **25.** *Lygophis dilepis*, **26.** *Oxyrhopus trigeminus*, **27.** *Pseudoboa nigra*, **28.** *Philodryas nattereri*, **29.** *Thamnodynastes* sp2, **30.** *Epictia borapeliotes*, **31.** *Bothrops erythromelas*.





Figures 32–39. Lizards collected at Seridó Ecological Station (ESEC Seridó): **32.** *Hemidactylus agrius*, **33.** *Lygodactylus klugei*, **34.** *Gymnodactylus geckoides*, **35.** *Phyllopezus periosus*, **36.** *Phyllopezus policaris*, **37.** *Tupinambis merianae*, **38.** *Cnemidophorus ocellifer*, **39.** *Ameiva ameiva*.





Figures 40–45. Lizards and chelonians collected at Seridó Ecological Station (ESEC Seridó): **40.** *Vanzosaura multiscutata*, **41.** *Mabuya heathi*, **42.** *Tropidurus hispidus*, **43.** *Tropidurus semitaeniatus*, **44.** *Iguana iguana*, **45.** *Mesoclemmys tuberculata*.

Low number of snake species results from sampling difficulties related to the group and the reduced sampling period (30 days) for snakes. Low abundances, cryptic habits and microhabitat specificity demand more efficient and specific capture methods as well as greater sampling efforts (Dorcas and Willson 2011; Bernarde 2012). Indeed, if we compare the present study species richness (eight species) to one described by Freire et al. (2009) (14 species) which was conducted over a much larger timeframe (2002–2004), our list still presents half of the species previously recorded, even though our sampling effort was much less.

Frog species richness at ESEC Seridó is average for the Caatinga domain. Previous studies have recorded from 12 to 26 species of frogs (Arzabe 1999; Vieira et al. 2007; Campos and Santos 2011; Silva and Santos 2011; Pedrosa et al. 2014). We collected frogs typically found in open areas, with a dominance of Leptodactylidae and Hylidae species; these are the most representative families in several Brazilian biomes (Bertoluci 1998; Bernarde 2007; Vieira et al. 2007). Although hylids are usually more abundant than leptodactylids, they had fewer species in ESEC Seridó. Such a trend is not common in Brazil, but it has been commonly reported

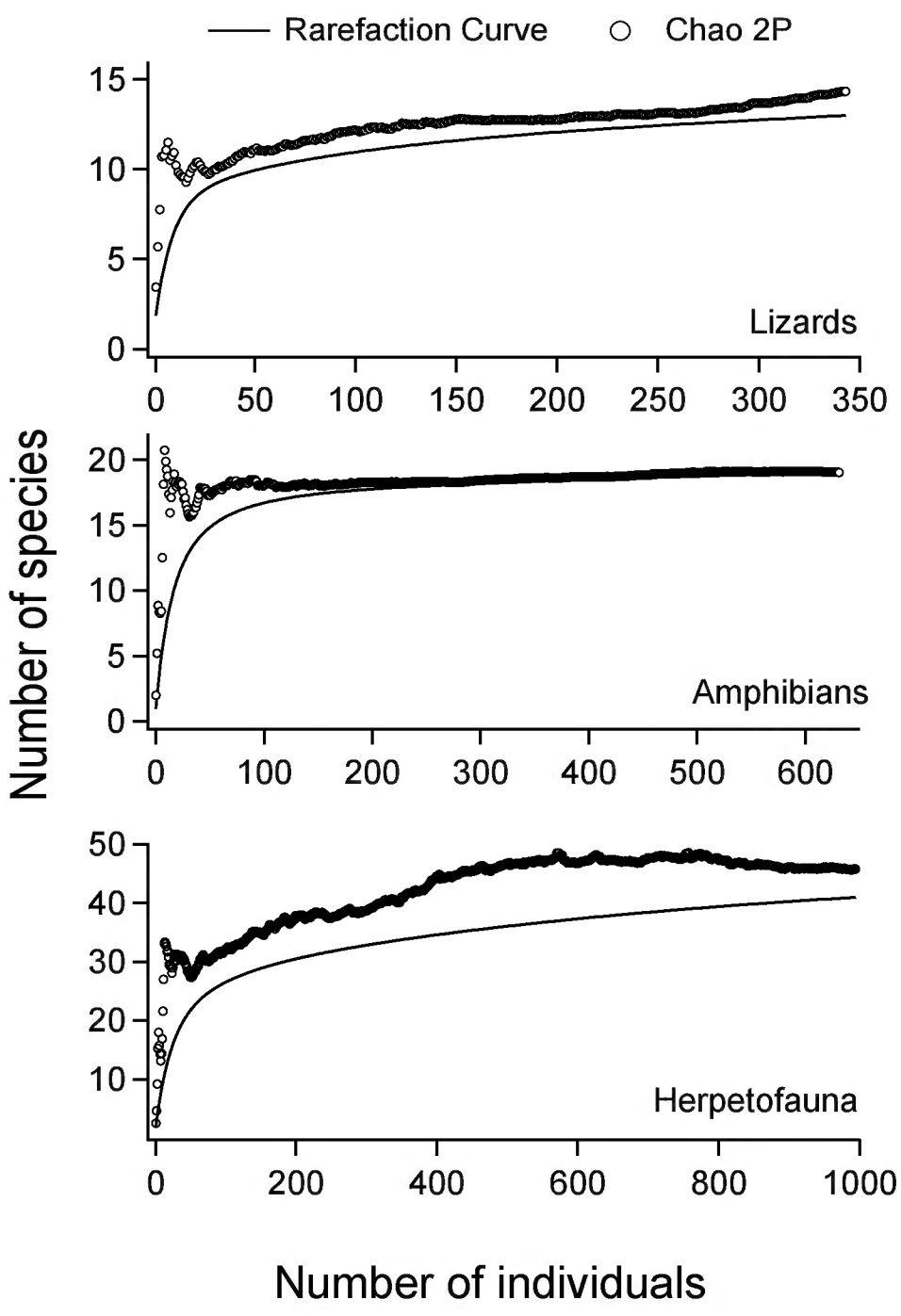


Figure 46. Species accumulation curves (circles) and rarefaction curves (lines) for lizards, amphibians and all herpetofauna based on number of individual specimens recorded at Seridó Ecological Station (ESEC-Seridó).

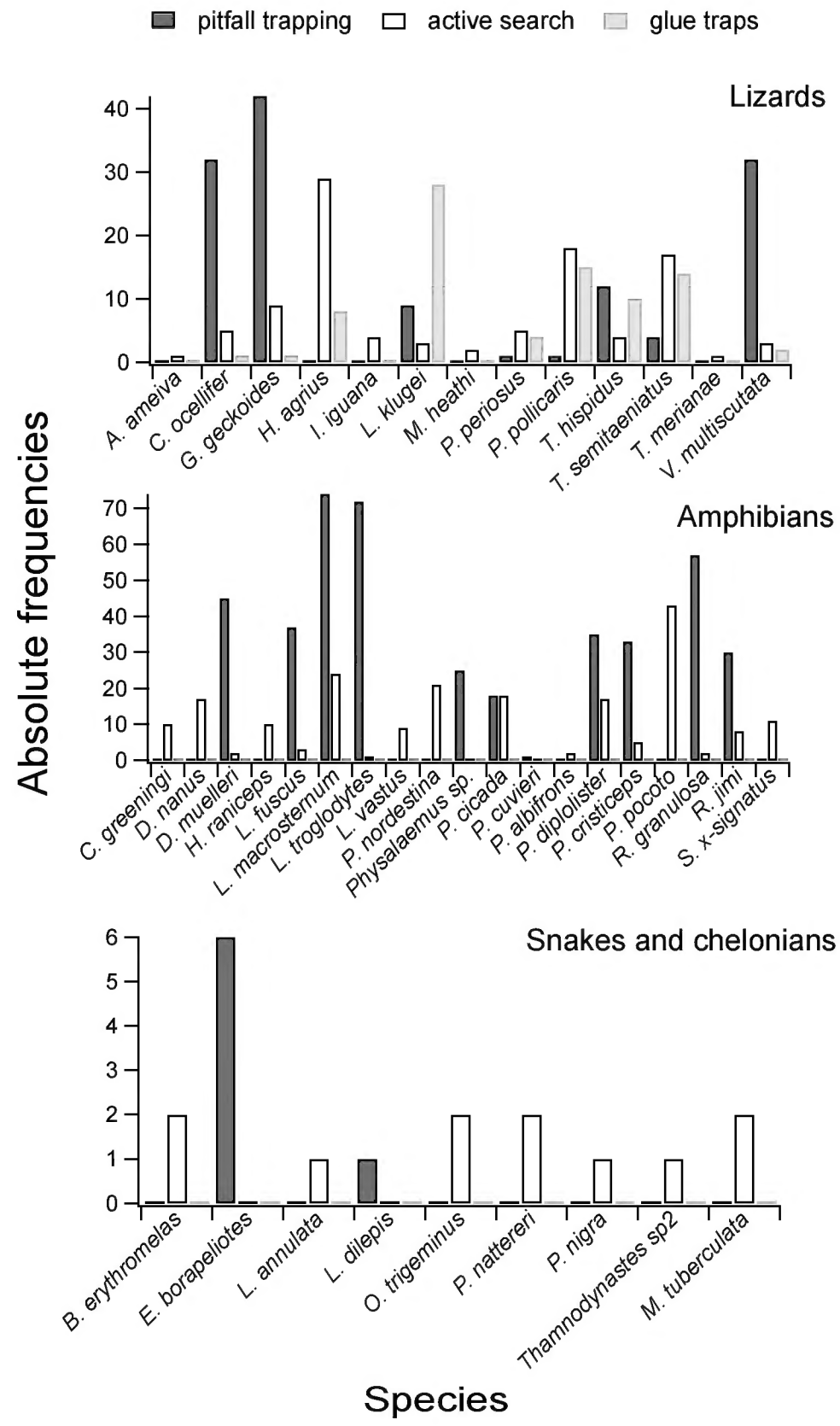


Figure 47. Absolute frequencies by collection method for lizards, amphibians, snakes and chelonians at Seridó Ecological Station (ESEC-Seridó).

for open environments (Cardoso et al. 1989; Arzabe 1999; Vieira et al. 2007). Herbaceous and shrub formations predominate in our study site, which in general presents a lower vertical stratification, possibly accounting for a lower richness of hylid species (Rossa-Feres and Jim 2001). Alternatively, the water deficit in the Caatinga could favor burrowing species, which are very common among leptodactylids. Accordingly, some recently studied Caatinga areas showing higher rates of hylids compared to leptodactylids (e.g., ESEC Raso da Catarina and PARNA Catimbau) presented mesic habitats with marked influences of Atlantic rainforest sites (Garda et al. 2013; Pedrosa et al. 2014).

Some frog species recorded are widely distributed in South America. These include *D. nanus*, *D. muelleri*, *Leptodactylus fuscus* (Schneider, 1799), *H. raniceps* and *S. x-signatus* (Frost 2016). Others such as *C. greeningi*, *P. nordestina*, *Physalaemus albifrons* (Spix, 1824), *Physalaemus cicada* Bokermann, 1966, *Proceratophrys cristiceps* (Müller, 1883), and *R. granulosa* are typically found in Caatinga but can also occur in adjacent biomes, such as Cerrado and Atlantic Forest (Arzabe 1999; Caramaschi 2006; Brandão et al. 2013; Silva et al. 2013; Silva et al. 2014). *Corythomantis greeningi*, *P. cicada*, and *P. albifrons* had their distributions recently expanded for Rio Grande do Norte (Magalhães et al. 2013; Silva et al. 2013), but this is their first record inside a protected area in the state.

Despite the important contributions of this inventory, additional sampling seems necessary at ESEC Seridó to provide a complete list of local diversity herpetofauna diversity. Our inventory, for example, failed to find lizard species identified in other inventories (*Hemidactylus brasilianus* [Amaral, 1935], *Polychrus acutirostris* Spix, 1825, and *Micrablepharus maximiliani* [Reinhardt & Lütken, 1862]; Freire et al. 2009). This is somewhat puzzling, given that our methods have efficiently captured those species in other Caatinga sites studied (Garda et al. 2013; Cavalcanti et al. 2014; Pedrosa et al. 2014; Magalhães et al. 2015). ESEC Seridó is within one of the major centres of desertification in Brazil (Sampaio

2003), and is one of the smallest strict protection areas in the country. Farms surround it, and hunters and livestock are frequently found inside the area. Because the local richness of the herpetofauna is not yet completely known for the "Seridó region", and because no data are available on species abundances over time, population trends, and hence, conservation of local biodiversity are hard to evaluate. The region's small size makes it easy to monitor and, as such, an ideal place to evaluate the impacts of human activity. There is a need for prolonged inventory and monitoring using reproducible methods to help with comparisons with other biomes and to show population trends over time.

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APPENDIX

Voucher List

Lizards — *Ameiva ameiva*: CHUFPB 6298. *Cnemidophorus ocellifer*: CHUFPB 5334. *Gymnodactylus geckoides*: CHUFPB 5343. *Hemidactylus agrius*: CHUFPB 5720. *Iguana iguana*: CHUFPB 5830. *Lygodactylus klugei*: CHUFPB 5471. *Mabuya heathi*: CHUFPB 6106. *Phyllopezus periosus*: CHUFPB 5956. *Phyllopezus pollicaris*: CHUFPB 5359. *Tropidurus hispidus*: CHUFPB 5339. *Tropidurus semitaeniatus*: CHUFPB 5329. *Tupinambis merianae*: CHUFPB 5409; *Vanzosaura multiscutata*: CHUFPB 5353.

Snakes — *Bothrops erythromelas*: CHUFPB 6114. *Epictia borapeliotes*: CHUFPB 5470. *Leptodeira annulata*: CHUFPB 7056. *Lygophis dilepis*: CHUFPB 5976. *Oxyrhopus trigeminus*: CHUFPB 5486. *Philodryas nattereri*: CHUFPB 5606. *Pseudoboa nigra*: CHUFPB 5410. *Thamnodynastes sp2*: CHUFPB 6055.

Chelonians — *Mesoclemmys tuberculata*: CHUFPB 5739.

Anuran amphibians — *Corythomantis greeningi*: CHUFPB 5452. *Dendropsophus nanus*: CHUFPB 5319. *Dermatonotus muelleri*: CHUFPB 5477. *Hypsiboas raniceps*: CHUFPB 5310. *Leptodactylus fuscus*: CHUFPB 5392. *Leptodactylus macrosternum*: CHUFPB 5318. *Leptodactylus troglodytes*: CHUFPB 5405. *Leptodactylus vastus*: CHUFPB 5315. *Physalaemus albifrons*: CHUFPB 5446. *Physalaemus cicada*: CHUFPB 5527. *Physalaemus cuvieri*: CHUFPB 5472. *Physalaemus* sp: CHUFPB 6171. *Pleurodema diplolister*: CHUFPB 5529. *Proceratophrys cristiceps*: CHUFPB 5447. *Pseudopaludicola pocoto*: CHUFPB 5451. *Rhinella granulosa*: CHUFPB 5330. *Rhinella jimi*: CHUFPB 5313. *Scinax x-signatus* CHUFPB: 5362.